

BMP #132 - Check Dams

DESCRIPTION

A small dam constructed in an open channel, swale, or drainageway. Check dams may be temporary or permanent barriers made of logs and brush, straw bales, stone, or other materials. They are used to reduce or prevent excessive bank and bottom erosion by reducing the gradient or runoff velocity.

APPLICATIONS

Check dams are often used in natural or constructed channels or swales where adequate vegetation cannot be established promptly. They are used below small drainage structures (smaller than 36 inch (900 mm) pipe culverts) but may be used below large structures if a diversion ditch cannot be used. Log and brush check dams should be placed where they will not cause flooding and where they can be left in place.

LIMITATIONS

Check dams should never be placed in live streams unless approved by appropriate local, state and/or federal authorities.

DESIGN PARAMETERS

Drainage area: The drainage area above the check dam should be between 1 and 4 hectares.

Spacing: The dams must be spaced so that the toe of the upstream dam is never any higher than the top of the downstream dam. Excavating a sump immediately upstream from the check dam improves its effectiveness.

Height: Maximum height should be 2 feet (600 mm). The center of the dam must be 16 to 10 inches (50 to 250 mm) lower than either edge, to form a weir for the outfall.

Width: The check dam should be as much as 20 inches (500 mm) wider than the banks of the channel to prevent undercutting as overflow water re-enters the channel.

Stabilization: Provide outlet stabilization below the lowest check dam (where the risk of erosion is greatest) and consider the use of channel linings or protection such as plastic sheeting or riprap where there may be significant erosion or prolonged submergence.

Targeted Pollutants

- ☒ Sediment
- ☐ Phosphorus
- ☐ Trace metals
- ☐ Bacteria
- ☐ Petroleum hydrocarbons

Physical Limits

Drainage area 10 ac

Max slope 50%

Min bedrock depth 2 ft

Min water table N/A

SCS soil type ABCD

Freeze/Thaw good

Drainage/Flood control yes

Materials:

- Stone 2 to 16 inches (50 to 400 mm) in diameter
- Logs 6 to 8 inches (150 to 200 mm) in diameter
- Sandbags filled with pea gravel
- Filter fabric meeting the standard specifications (see BMP #135, Silt Fence)

Embedding: The logs should be driven into the ground a minimum of 28 inches (700 mm).

CONSTRUCTION GUIDELINES

Rock check dams: Place the stones on filter fabric either by hand or using appropriate machinery; do not simply dump them in place. Keep the side slopes 1:2 or flatter.

Lining the upstream side of the dam with a layer of 0.8 to 1.1 inch (20 to 30 mm) gravel 12 inches (300 mm) deep is a suggested option for additional channel protection.

Log check dams: Logs must be firmly embedded in the ground. Intermingled brush and logs or filter cloth may be attached to the upstream side of the dam to retard the flow and trap additional sediment. If a filter cloth is used, it should be securely stapled to the top of the dam and adequately anchored in the streambed.

Sandbag check dams: Be sure that all bags are securely sealed. Place the bags by hand or use appropriate machinery to place them in an interlocking pattern.

Gravel-filled burlap bags: Gravel-filled burlap bags may be used for temporary check dams in areas of concentrated flow. Fold the burlap bag flaps under the bags in a direction away from the water flow. Construct gravel bag check dams such that the crest of the downstream check dam is approximately level with the toe of the upstream check dam. Install check dams so the side end points are higher than the centerline crest. Erosion caused by high flows around the edges should be corrected immediately.

Riprap may be necessary on the downstream side of the dam to protect the streambed from scour.

MAINTENANCE

Inspect the check dams regularly and after every runoff-producing storm. Make any repairs necessary to ensure the measure is in good working order.

Remove accumulated leaves and sediments from behind the dam when they reach a depth of one-half the original height of the dam. Dispose of all materials properly so they don't contribute to pollution problems at the disposal site.

Restore stone as necessary for the dams to maintain their correct height. On sandbag dams, inspect the sandbag fabric for signs of deterioration.

Check dams (Portland and USA, 1994)

Gravel-filled sandbag check dams (Woodward-Clyde Consultants, 1994)